

WHAT IS CLAIMED IS:

1. An image processing apparatus which sequentially processes graphic rendering instructions for
5 image data, said graphic rendering instructions including first and second graphic rendering instructions, said first graphic rendering instruction being input immediately preceding said second graphic rendering instruction, said first graphic rendering instruction containing first
10 rendering data representing a first original image to render a first output image, said second graphic rendering instruction containing second rendering data representing a second original image to render a second output image, said first original image being overlaid by said second original
15 image said image processing apparatus comprising:

overlay detector configured to perform an overlay detection to detect an overlay of the first and second original images which are rendered based on the first and second rendering data by the first and second rendering
20 instructions, respectively; and

a memory storing the first rendering data contained in the first graphic rendering instruction, wherein the overlay detector specifies a portion of the first original image to be overlaid by the second original

image upon detecting an overlay of the first and second original images, deletes a specified portion and draws a third output image, based on the original images, in which the specified portion of the first original image is
5 deleted and stores the second graphic rendering data into the memory.

2. The image processing apparatus as defined in Claim 1, wherein said graphic rendering instructions are
10 configured to be a page description language and each of said graphic rendering instructions are configured to include a fundamental graphic description instruction which handles characters, graphics and images and a rendering attribute instruction handling colors, clipping area
15 designations and rendering arithmetic methods.

3. The image processing apparatus as defined in Claim 1, wherein said graphic rendering instructions are configured to be converted into at least one of
20 intermediate data represented by coordinate information and a PDL language.

4. The image processing apparatus as defined in Claim 1, wherein each of the first and second original

images is configured to include at least one of rectangle figure and run aggregate figure.

5. The image processing apparatus as defined in
5 Claim 4, wherein the overlay detector is configured to perform the overlay detection by each run when the overlay detection means detects an overlay of the run aggregate figures.

10 6. The image processing apparatus as defined in Claim 4, wherein when the overlay detector is configured to detect an overly of the run aggregate figures, the overlay detecting means is configured to generate a circumscribing rectangle for the run aggregate figure of the first and
15 second original images and, after the overlay detecting means detects an overlay between the circumscribing rectangle for the run aggregate figure for the first and second original images, to determine the run aggregate figure included in the run aggregate figure of an overlaid
20 portion between the first and second original images of the circumscribed rectangle.

7. The image processing apparatus as defined in Claim 6, wherein the overlay detector is configured to

determine whether, for the run aggregate figure included in the run aggregate figure of an overlaid portion between the first and second original images of the circumscribed rectangle, to perform the overlay detection by each run.

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8. The image processing apparatus as defined in Claim 1, wherein the second output image is configured to be overwritten on the third output image.

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9. The image processing apparatus as claimed in Claim 8, wherein the first and second output image are configured to be drawn with a rendering process based on at least one of a mono chrome, an RGB video color rendering, and a CMYK paint color rendering.

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10. An image processing apparatus which sequentially processes graphic rendering instructions for image data, said graphic rendering instructions including first and second graphic rendering instructions, said first graphic rendering instruction being input immediately preceding said second graphic rendering instruction, said first graphic rendering instruction containing first rendering data representing a first original image to render a first output image, said second graphic rendering

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instruction containing second rendering data representing a second original image to render a second output image, said first original image being overlaid by said second original image, said image processing apparatus comprising:

5 overlay detecting means for performing an overlay detection to detect an overlay of the first and second original images which are rendered based on the first and second rendering data by the first and second rendering instructions, respectively; and

10 a memory storing the first rendering data contained in the first graphic rendering instruction, wherein the overlay detecting means detects a portion of the first original image to be overlaid by the second original image upon detecting an overlay of the first and
15 second original images, deletes a specified portion and draws a third output image, based on the first original image, in which the specified portion of the first original image is deleted and stores the second graphic rendering data into the memory.

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11. The image processing apparatus as defined in Claim 10, wherein said graphic rendering instructions are a page description language and each of said graphic rendering instructions includes a fundamental graphic

description instruction which handles characters, graphics and images and a rendering attribute instruction handling colors, clipping area designations and rendering arithmetic methods.

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12. The image processing apparatus as defined in Claim 10, wherein said graphic rendering instructions are converted into at least one of intermediate data represented by coordinate information and a PDL language.

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13. The image processing apparatus as defined in Claim 10, wherein each of the first and second original images includes at least one of rectangle figure and run aggregate figure.

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14. The image processing apparatus as defined in Claim 13, wherein the overlay detection means performs the overlay detection by each run when the overlay detection means detects an overlay of the run aggregate figures.

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15. The image processing apparatus as defined in Claim 13, wherein when the overlay detecting means detects an overly of the run aggregate figures, the overlay detecting means generates a circumscribing rectangle for

the run aggregate figure of the first and second original images and, after the overlay detecting means detects an overlay between the circumscribing rectangle for the run aggregate figure for the first and second original images,
5 determines the run aggregate figure included in the run aggregate figure of an overlaid portion between the first and second original images of the circumscribed rectangle.

16. The image processing apparatus as defined in
10 Claim 15, wherein the overlay detecting means determines whether the run aggregate figure included in the run aggregate figure of an overlaid portion between the first and second original images of the circumscribed rectangle, and the overlay detection is performed by each run.

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17. The image processing apparatus as defined in Claim 10, wherein the second output image is overwritten in the third output image.

20 18. The image processing apparatus as claimed in Claim 15, wherein the first and second output image are drawn with a rendering process based on at least one of a mono chrome, an RGB video color rendering, and a CMYK paint color rendering.

19. An image processing method which sequentially processes graphic rendering instructions for image data, said graphic rendering instructions including first and second graphic rendering instructions, said first graphic rendering instruction being input immediately preceding said second graphic rendering instruction, said first graphic rendering instruction containing first rendering data representing a first original image to render a first output image, said second graphic rendering instruction containing second rendering data representing a second original image to render a second output image, said first original image being overlaid by said second original image, said image processing method comprising the steps of:

performing an overlay detection to detect an overlay of the first and second images which are rendered based on the first and second rendering data by the first and second rendering instructions, respectively; and

storing the first rendering data contained in the first graphic rendering instruction,

wherein the overlay detecting methods specifies a portion of the first original image to be overlaid by the second original image upon detecting an overlay of the first and second original images, deletes a specified portion and

draws a third output image, based on the first original image, in which the specified portion of the first original image is deleted and stores the second graphic rendering data into the memory.

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20. The image processing method as defined in Claim 19, wherein said graphic rendering instructions are a page description language and each of said graphic rendering instructions includes a fundamental graphic description instruction which handles characters, graphics and images and a rendering attribute instruction handling colors, clipping area designations and rendering arithmetic methods.

21. The image processing method as defined in Claim 19, wherein said graphic rendering instructions are converted into at least one of intermediate data represented by coordinate information and a PDL language.

22. The image processing method as defined in Claim 19, wherein each of the first and second original images includes at least one of rectangle figure and run aggregate figure.

23. The image processing method as defined in Claim

22, wherein the overlay detection step performs the overlay detection by each run when the overlay detection step detects an overlay of the run aggregate figures.

5 24. The image processing method as defined in Claim 22, wherein when the overlay detection step detects an overly of the run aggregate figures, the overlay detection step generates a circumscribing rectangle for the run aggregate figure of the first and second original images
10 and, after the overlay detection detects an overlay between the circumscribing rectangle for the run aggregate figure for the first and second original images, determines the run aggregate figure included in the run aggregate figure of an overlaid portion between the first and second
15 original images of the circumscribed rectangle.

 25. The image processing method as defined in Claim 24, wherein the overlay detection determines whether the run aggregate figure included in the run aggregate figure
20 of an overlaid portion between the first and second original images of the circumscribed rectangle, and performs the overlay detection by each run.

 26. The image processing method as defined in Claim

19, wherein the second output image is overwritten in the third output image.

27. The image processing method as claimed in Claim 5 24, wherein the first and second output image are drawn with a rendering process based on at least one of a monochrome, an RGB video color rendering, and a CMYK paint color rendering.

10 28. A printing apparatus which sequentially processes graphic rendering instructions for image data, said graphic rendering instructions including first and second graphic rendering instructions, said first graphic rendering instruction being input immediately preceding 15 said second graphic rendering instruction, said first graphic rendering instruction containing first rendering data representing a first original image to render a first output image, said second graphic rendering instruction containing second rendering data representing a second 20 original image to render a second output image, said original first image being overlaid by said second original image, said printing apparatus comprising:

overlay detecting means for performing an overlay detection to detect an overlay of the first and second

original images which are rendered based on the first and second rendering data by the first and second rendering instructions, respectively; and

5 a memory storing the first rendering data contained in the first graphic rendering instruction, wherein the overlay detecting means specifies a portion of the first original image to be overlaid by the second original image upon detecting an overlay of the first and second original images, deletes a specified portion and
10 draws a third output image, based on the first original image, in which the specified portion of the first original image is deleted and stores the second graphic rendering data into the memory.

15 29. The printing apparatus as defined in Claim 28, wherein said graphic rendering instructions are a page description language and each of said graphic rendering instructions includes a fundamental graphic description instruction which handles characters, graphics and images
20 and a rendering attribute instruction handling colors, clipping area designations and rendering arithmetic methods.

30. The printing apparatus as defined in Claim 28, wherein said graphic rendering instructions are converted

into at least one of intermediate data represented by
coordinate information and a PDL language.

31. The printing apparatus as defined in Claim 28,
5 wherein each of the first and second original images
includes at least one of rectangle figure and run aggregate
figure.

32. The printing apparatus as defined in Claim 31,
10 wherein the overlay detection means performs the overlay
detection by each run when the overlay detection means
detects an overlay of the run aggregate figures.

33. The printing apparatus as defined in Claim 31,
15 wherein when the overlay detecting means detects an overly
of the run aggregate figures, the overlay detecting means
generates a circumscribing rectangle for the run aggregate
figure of the first and second original images and, after
the overlay detecting means detects an overlay between the
20 circumscribing rectangle for the run aggregate figure for
the first and second original images, determines whether
the run aggregate figure included in the run aggregate
figure of an overlaid portion between the first and second
original images of the circumscribed rectangle.

34. The printing apparatus as defined in Claim 33,
wherein the overlay detecting means determines the run
aggregate figure included in the run aggregate figure of an
5 overlaid portion between the first and second original
images of the circumscribed rectangle, and the overlay
detection is performed by each run.

35. The printing apparatus as defined in Claim 28,
10 wherein the second output image is overwritten in the third
output image.

36. The printing apparatus as claimed in Claim 33,
wherein the first and second output image are drawn with a
15 rendering process based on at least one of a mono chrome,
an RGB video color rendering, and a CMYK paint color
rendering.

37. A host PC which sequentially processes graphic
20 rendering instructions for image data, said graphic
rendering instructions including first and second graphic
rendering instructions, said first graphic rendering
instruction being input immediately preceding said second
graphic rendering instruction, said first graphic rendering

instruction containing first rendering data representing a first original image to render a first output image, said second graphic rendering instruction containing second rendering data representing a second original image to
5 render a second output image, said first original image being overlaid by said second original image, said host PC comprising:

overlay detecting means for performing an overlay detection to detect an overlay of the first and second
10 original images which are rendered based on the first and second rendering data by the first and second rendering instructions, respectively; and

a memory storing the first rendering data contained in the first graphic rendering instruction,
15 wherein the overlay detecting means specifies a portion of the first original image to be overlaid by the second original image upon detecting an overlay of the first and second original images, deletes a specified portion and draws a third output image, based on the first original
20 image, in which the specified portion of the first original image is deleted and stores the second graphic rendering data into the memory.

38. The host PC as defined in Claim 37, wherein

said graphic rendering instructions are a page description language and each of said graphic rendering instructions includes a fundamental graphic description instruction which handles characters, graphics and images and a rendering attribute instruction handling colors, clipping area designations and rendering arithmetic methods.

39. The host PC as defined in Claim 37, wherein said graphic rendering instructions are converted into at least one of intermediate data represented by coordinate information and a PDL language.

40. The host PC as defined in Claim 37, wherein each of the first and second original images includes at least one of rectangle figure and run aggregate figure.

41. The host PC as defined in Claim 40, wherein the overlay detection means performs the overlay detection by each run when the overlay detection means detects an overlay of the run aggregate figures.

42. The host PC as defined in Claim 40, wherein when the overlay detecting means detects an overly of the run aggregate figures, the overlay detecting means

generates a circumscribing rectangle for the run aggregate figure of the first and second original images and, after the overlay detecting means detects an overlay between the circumscribing rectangle for the run aggregate figure for
5 the first and second original images, determines the run aggregate figure included in the run aggregate figure of an overlaid portion between the first and second original images of the circumscribed rectangle.

10 43. The host PC as defined in Claim 42, wherein the overlay detecting means determines the run aggregate figure included in the run aggregate figure of an overlaid portion between the first and second original images of the circumscribed rectangle, and the overlay detection is
15 performed by each run.

 44. The host PC as defined in Claim 37, wherein the second output image is overwritten in the third output image.

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 45. The host PC as claimed in Claim 42, wherein the first and second output image are drawn with a rendering process based on at least one of a mono chrome, an RGB video color rendering, and a CMYK paint color rendering.

46. An image forming apparatus which sequentially processes graphic rendering instructions for image data, said graphic rendering instructions including first and
5 second graphic rendering instructions, said first graphic rendering instruction being input immediately preceding said second graphic rendering instruction, said first graphic rendering instruction containing first rendering data representing a first original image to render a first
10 output image, said second graphic rendering instruction containing second rendering data representing a second original image to render a second output image, said first original image being overlaid by said second original image, said image forming apparatus comprising:

15 overlay detecting means for performing an overlay detection to detect an overlay of the first and second original images which are rendered based on the first and second rendering data by the first and second rendering instructions, respectively; and

20 a memory storing the first rendering data contained in the first graphic rendering instruction, wherein the overlay detecting means specifies a portion of the first original image to be overlaid by the second original image upon detecting an overlay of the first and

second original images, deletes a specified portion and
draws a third output image, based on the first original
image, in which the specified portion of the first original
image is deleted and stores the second graphic rendering
5 data into the memory.

47. The image forming apparatus as defined in Claim
46, wherein said graphic rendering instructions are a page
description language and each of said graphic rendering
10 instructions includes a fundamental graphic description
instruction which handles characters, graphics and images
and a rendering attribute instruction handling colors,
clipping area designations and rendering arithmetic methods.

15 48. The image forming apparatus as defined in Claim
46, wherein said graphic rendering instructions are
converted into at least one of intermediate data
represented by coordinate information and a PDL language.

20 49. The image forming apparatus as defined in Claim
46, wherein each of the first and second original images
includes at least one of rectangle figure and run aggregate
figure.

50. The image forming apparatus as defined in Claim 49, wherein the overlay detection means performs the overlay detection by each run when the overlay detection means detects an overlay of the run aggregate figures.

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51. The image forming apparatus as defined in Claim 49, wherein when the overlay detecting means detects an overly of the run aggregate figures, the overlay detecting means generates a circumscribing rectangle for the run aggregate figure of the first and second original images and, after the overlay detecting means detects an overlay between the circumscribing rectangle for the run aggregate figure for the first and second original images, determines the run aggregate figure included in the run aggregate figure of an overlaid portion between the first and second original images of the circumscribed rectangle.

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52. The image forming apparatus as defined in Claim 51, wherein the overlay detecting means determines the run aggregate figure included in the run aggregate figure of an overlaid portion between the first and second original images of the circumscribed rectangle, and the overlay detection is performed by each run.

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53. The image forming apparatus as defined in Claim 46, wherein the second output image is overwritten in the third output image.

5 54. The image forming apparatus as claimed in Claim 51, wherein the first and second output image drawn with a rendering process based on at least one of a mono chrome, an RGB video color rendering, and a CMYK paint color rendering.

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